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Bee-Culture in Cottage Hives.

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QUEENLESSNESS.

Queenlessness consists in the want of a queen bee in a colony. It proves fatal to the colony only when it occurs at a season when a young queen cannot be reared or fertilized, or when eggs or brood suitable for queen-raising are not to be found in the hive. The total barrenness of a queen, or her inability to lay any other than drone eggs, is, in its results, precisely similar to queenlessness; and cure involves the removal of such a queen, and the substitution of one normally fertile.

The two latter are cases of rare occurrence, as is likewise that where a queen, from disease or super-annuation, ceases to produce eggs. The most common case is that where the queen is missing or lost. Her death or destruction may be the result of various causes She may have died from disease or super-annuation; she may have been accidentally killed while the combs were being examined in the spring or fall; or she may have been inadvertantly removed when a super or a section was taken away without due examination of its contents. These, originating in the carelessness of the bee-keeper, are avoidable cases. If it happen that at the time of the loss or removal of the queen there are no eggs or no suitable worker brood in the hive, from which a young queen could be reared; or if it occur at a season when no drones exist, or when the weather does not permit the bees to fly, the young queen could not be fertilized, and the colony must ultimately perish. Sometimes, too, the embryo queen perishes in her cell before attaining maturity, or the workers open the cell prematurely, and destroy her. We refer now chiefly to cases where the effort is to replace a lost queen at other periods than the swarming season, for when a hive swarms naturally, a number of queen cells have usually been started and are more or less advanced, so that in such cases the casualties adverted to rarely present themselves, though even then other dangers may impend. But nearly all of these also may be averted by simply removing the hive which has swarmed to a new stand, and setting the swarm in its stead. A first swarm rarely becomes queenless, even in the second year; and a parent hive thus transposed with the prime swarm has never become so in our apiary.

On the other hand, queenlessness almost invariably ensues in a hive greatly reduced by reiterated swarming. During the issuing of successive swarms, and even during the confusion and tumult attending abortive attempts at swarming, it frequently happens that several young queens emerge from their cells, and the whole of them accompany the last swarm, leaving the parent hive queenless and without the means of supplying the want. But the most common occurrence when a number of young queens have simultaneously left their cells, and circumstances then prevent swarming, is that each young queen having its own adherents, all will be killed or expelled by the excited workers pertaining to the contending factions. Occasionally, too, several queens may encounter each other during the reign of confusion, and if both be not killed in the conflict, the survivor may be so seriously injured as to be unable to fly, and be thus disqualified from becoming a normally fertile queen. For every young queen—and this is the great danger to which every colony containing a *newly-reared* queen is exposed—must make at least one, and usually several, excursions to meet the drones on the wing, and may then perish from various causes. Even if she return from a successful excursion, she may, in her haste, enter a wrong hive and be slain, or she may even be destroyed by the bees of her own hive, which happens much more frequently than is usually thought. But when the parent stock and swarm are transposed immediately after swarming, there is no reason to apprehend the loss of the queen. We have never known it to occur in such case. The reason probably is that all the tumult and confusion attending afterswarming are prevented, as the supernumerary queens are at once destroyed after transposition, and the selected young queen no longer incurs any risk from internal foes.

The chief means of preventing the occurrence of queenlessness in an apiary are these: First, that the swarm must invariably be set where the parent stock stood, and the latter removed, immediately after swarming, to as great a distance in the apiary as practicable, from its former location. Second, that the hives of parent stocks be set as much apart as possible from all others in the apiary, and made to differ from them in external appearance by affixing to them some prominent mark in front, easy to be recognized by the returning young queen; and that the hives of any afterswarms we choose to preserve be treated in the same manner. Third, that care be taken not to stand in front of any hive containing young unfertilized queens, from noon to eve, so as to interfere with the flight of the bees, or mislead the queen on her return. Fourth, that the queens of the non-swarming store stocks be removed before becoming super-annuated—doing this at a time when there are eggs and worker brood in the hive, and at a season when drones still abound. Fifth, that care be taken not to injure or mulitate the queen when stores are removed, or that she be not carried off where a super or a surplus honey-box is taken away.

It is easily ascertained by examination whether a queen is or has become a drone-breeder, because such a queen deposits her eggs almost exclusively in worker cells, and the brood is as compactly placed as the worker brood in normal stocks, but the cells are covered with elevated or concave caps, and the great mass of the emerging young are small-sized drones.

It is much more difficult to ascertain seasonably whether a queen is barren or not, either from disease or advanced age, or from not having had concourse with a drone. In these cases there is a queen present, though she produces no eggs. The only certain evidence here is the gradual decrease of population, and the entire absence of worker brood. It rarely happens that a fertile worker begins to lay drone eggs in the presence of a young unfecundated queen.

When there is no queen in a hive, the fact is more readily ascertained. The surest evidence thereof is when, in spring or fall, we observe drone brood placed in irregular patches or clusters. Frequently a number of such cells are built together, and have only one common cap or cover, or some few are more elevated than others, and capped distinctly. No worker brood whatever is seen; the population is weak; the bees are scattered about on the combs, and on lifting the hive they do not rush forward in crowds, but come singly, with a kind of intermitting plaintive wail. When such appearances present themselves, the colony is almost infallibly lost, whether it have a drone-breeding queen or none. The bees have become dispirited, and, being now old, will generally refuse or neglect to rear a queen, even if suitable brood be offered them, and the season be otherwise favorable. The winding up is usually a sudden invasion by hordes of robbers, and an entire abandonment of the premises. A competent apiarian will of course not let matters come to this pass. Seasonable observation will have enabled him to discern by certain indications which of his colonies are queenless, or at least in a suspicious condition, while remedies are yet available. Among these indications are the following:

1. In the evening of the day on which a colony has lost its queen, the bees will be exceedingly restless and excited, running in and out of the hive, and over the alighting-board, hurriedly and frequently jostling each other, apparently in great uneasiness and alarm, as though in search of something. Equally striking are the sadly mournful tones they occasionally utter in the hive, followed by profound silence. This is an evidence of queenlessness described already with minuteness by old writers on bee-culture, and of the correctness of which we had the misfortune to have ocular proof in our apiary the first year we kept bees. It will be found to present itself even in the case of the strongest and most populous store stocks and magazine hives, if we happen to be present when the loss occurs, though in such the commotion is more transient, as the bees, conscious of their strength, are apt to neglect taking the needed prompt measures to repair their loss, and thus remain queenless. It is hence judicious to watch the hives daily, in spring and summer, from about four o'clock in the afternoon to eight in the evening, so that anything suspicious in the deportment of the bees at such time may not escape observation. Populous colonies especially, and such as have roomy hives, should be regularly inspected, because in such the diminution of numbers is not so soon noticed, and they frequently continue gathering pollen much longer after losing their queen than weaker stocks do. Store stocks also should be daily subjected to close scrutiny, because, as they do not swarm, they change their queens occasionally, and are therefore exposed to the danger of becoming queenless on such occasions.

2. It is much easier to detect queenlessness in stocks which have produced a swarm. Lift the parent stock early on the morning of the twenty-eighth day after the first swarm left. If the drones are then found lying compactly on the bottom board of the hive, it is evidence that the young queen is fertile and has begun to lay eggs. If the drones are not so found, the colony is queenless. If the first swarm and the parent stock were transposed after the swarm was hived, this evidence will present itself still earlier, often as early as on the fourteenth day, and can be confidently relied on.

Knauff says: "If we cut out a piece of drone comb densely covered by workers, on the 28th day after the colony has produced a swarm, and find eggs in the cells—some of these even containing several eggs—we may conclude that the colony is certainly queenless." This is doubtless so; but occasionally no eggs are found, as there happens to be no fertile worker among the bees, and yet the colony may be queenless. On our system of transposing the parent stock and the swarm, we can always tell in about fourteen days how matters stand. If in that time the bees have been quiet, manifesting no symptoms of uneasiness, and if on the twenty-eighth day or sooner the drones are literally packed down

on the bottom-board, (or in layers against the front,) the young queen is certainly present and fertile, for so soon as the bees are conscious that drones are no longer needed, and there is no such superabundance of stores, nor such density of population, as to encourage further swarming, they will systematically crowd the drones away from the honey combs to the bottom-board or such part of the hive as contains no honey.

3. If we wish to ascertain whether an after-swarm has a fertile queen, we cut out a piece of the newly-built worker comb on the *tenth* day after the swarm was hived. If it contains eggs, the queen is fertile; if it contains none, the colony is queenless. This is Knauff's rule. We think it cannot always be depended on. We re-examine the hive three or four days after, and if we find that the bees have refilled the place from which the piece was cut, with worker comb, and lengthened out the rudimental worker cells around it, the colony is not queenless. But if the bees have built drone combs there, or have omitted building altogether, the colony is certainly queenless.

These tests hold good also in the case of parent stocks, if made twenty-eight days after the first swarm issued.

In the case of afterswarms, even a moderately experienced bee-keeper can readily ascertain the true condition of these swarms within two weeks after they were hived. If the queen was lost, the activity of the bees will decline obviously within that time, if it do not wholly cease. The workers appear dispirited, flying languidly, and crowding in a cluster against the top of the hive inside, daily diminishing in number, and dispersing.

4. It is much more difficult to detect queenlessness in colonies which have produced no swarms, especially in large store stocks, unless we casually note the indications referred to under No. 1. But we may easily fail to observe these in those months (from October to March) when the stocks are less frequently examined. If queenlessness occur in such colonies in the summer months, or prior to October, the indications can scarcely fail to attract the attention of an observant bee-keeper, for, in the first place, he will see, from the diminished activity of the bees, that some untoward occurrence has taken place. He will also occasionally observe dead drone brood cast out on the alighting-board; and no young workers will ever be seen on the wing in front of the hive, testing their ability to fly. In the second place, the bees will neglect to expel the drones, but suffer them to pass in and out unmolested. This is a sure sign of queenlessness. A few solitary drones may be tolerated out of season in a normal colony, but masses of them, never. In the third place, if we tap gently on the hive, or lift it, or blow some smoke in it, a mournful and long-continued humming will ensue. The workers will present themselves scatteringly between the combs, and not in dense columns as in normal colonies. A colony that has a fertile queen will respond brusquely when thus treated, the tones quickly subsiding to a gentle humming, and the bees will rush up in crowds from between the central combs. If, in the fourth place, drone brood presents itself, placed regularly in worker cells, or irregularly in drone cells, there can be no further question as to the destitute condition of the colony.

On all these points, careful revision of the colonies in autumn will supply the needed elucidation, and a careful bee-keeper will consequently rarely be misled into attempting to winter a queenless stock.

Less sure are the indications furnished by a colony which has become queenless in winter, particularly if populous and well-supplied with honey. The bees are then in their winter quarters, and we must disturb them as little as may be. On this account, we may even scarcely venture to visit them daily. When the queen perishes in the winter, efforts to rear a young one to supply her place are seldom successful, because drones are then rarely found, and the inclemency of the weather does not permit the young queen to leave the hive. At the same time the colony may still be populous, and be very active in early spring, gathering honey and pollen apparently with as much zeal and eagerness as others. This may, *for a time*, deceive the most watchful bee-keeper.

If the colonies be attentively observed when the bees are flying on occasional mild days in winter, we may easily form an accurate judgment of their condition. If the bees fly briskly, cleanse their hives diligently, making a joyful, self-satisfied humming the while, it is fair to infer that they have a queen; while the contrary are indications of queenlessness, or at least furnish grounds for doubt and suspicion. Sometimes, too, in winter, queenlessness manifests itself by a certain restlessness of the bees, especially when the weather suddenly changes. This may be accompanied by a long melancholy moan or whine not easily described, nor soon forgotten when once heard. This may be brought on in a queenless colony if it be suddenly jarred, as once occurred with us when bringing a hive out from its winter receptacle to replace it on its summer stand, whereupon the bees rushed suddenly, in large numbers, out of the entrance. A sound colony will flare up likewise on such occasions, but they do not become alarmed and confused, and soon relapse into quietude. The hive we were removing proved to be queenless, as I presumed at the time it was.

The question now recurs—What is to be done when a colony becomes queenless? The answer depends in the main, on two circumstances. First, on the district in which the colony or apiary is situated; and, secondly, on the season in which the queenlessness is first observed. For if in the former pasturage ceases to be available as early as in July, and a colony becomes queenless in June, it will hardly be worth while to attempt a cure unless the colony be still populous, and we have a fertile queen in reserve. But even then twenty-one days will elapse before the first young bees will emerge, and it rarely happens that such a colony will secure stores enough for the winter. Still, if such a queen is available, the queenless colony to be treated must nevertheless be a strong or

populous one, for it would be wasting time and money to give a fertile queen to a mere handful of workers at so advanced a season. Better drive out the bees and unite them with some other colony, and give the hive and its contents as a super to some thriving stock, or reserve it for the use of some swarm next spring. If we have a supply of reserve queens in June, and desire to increase the number of our stocks, it will be better to use them in forming artificial colonies than to introduce them into weak stocks in which, moreover, they run the risk of being destroyed, unless carefully supervised. In poor honey districts, therefore, it must be regarded as a settled rule to drive out the bees of queenless stocks, and unite them with those of other thriving colonies, and to decline all attempts at re-queening, except when, perchance, a populous stock loses its queen in April or May. In such case, the young bees reared might render service in June, if the effort at queen-raising prove not a failure, as it is apt to do in inexperienced hands. It is surest and best always to unite the bees of a queenless stock with some other colony, and reserve the combs for supers or new swarms.

If a stock be found queenless in the winter months, the best that can be done is to *let it alone*. Knauff, indeed, advises in such case that the hive be inverted, and another containing a queen set over it, letting it remain thus superposed till the first mild day. If it be then found that the queenless bees have ascended into the upper hive, replace the latter on its stand; but if the bees are still hanging down in a cluster into the lower hive, interpose an empty eke or ring between the two hives, and the bees will soon withdraw into the upper. This plan will succeed, if the queenlessness of the stock be discovered early in the winter; otherwise both colonies will be apt to become excited and unruly, as disturbance at such time induces increased consumption of honey. The bees then uncluster, spread through the hive, soil the interior, and perish from cold. Thus, instead of succeeding in saving one colony, we run the risk of losing two. It is therefore best to defer operations till a fair day or the return of mild weather enables the bees to fly and evacuate their fæces, and thereupon to unite the queenless bees with some other colony.

Various processes for uniting have been proposed and adopted. Some simply expel the queenless bees from their hive by means of smoke from rags, wormwood, or tobacco, and let them seek for quarters by dispersing among the other stocks in the apiary. That they may be kindly received and accepted in those, all the stocks are fed a day or two previous with diluted honey, strongly scented with peppermint, anniseed, or lavender. A warm, clear day should be chosen for expelling the bees, and such as obstinately adhere to the hive should be brushed off and carried to the stock with which they are to be united. If it be preferred to effect the union by stupifying the queenless bees by means of ether, chloroform, or fungus, they should not be previously fed, or many of them will suffer from the operation. The latter process is the more expeditious and effectual, if properly managed. The stupified bees should be gently brushed from the combs and out of the hive upon a sheet of paste-board or stout paper, and laying thereon some strips of inch stuff, place on them the hive to which they are to be joined before the bees have recovered from their stupor. They will then ascend as they revive, and unite with the other inmates, without endangering the queen. The fume of the fungus, or the vapor of ether or chloroform, must be introduced suddenly and plentifully, so that the bees come under its influence quickly and thoroughly, or many of them will take refuge in the cells of the combs, from which it will be difficult to dislodge them.

Mr. Huber recommends as a safe mode of introducing a queen that the bees of a colony be stupified late in the evening, and to place upon the fallen mass, before its revival, the queen designed to be given to them. He says it is not necessary that their old queen should be previously removed. Mr. Kaden, however, thinks that prudence requires that the old queen be first taken away, and from our own observations, we think the precaution entirely proper. We prefer also to undertake the operation in the forenoon, previously removing the hive to a new location, to which all the bees that are stupified will thenceforward adhere. Those which were absent at the time, (by which alone the new queen would be endangered,) will join some other stock in the neighborhood; and conscious that they are strangers there, they will not be disposed to molest the queen of such stock, should they encounter her.

Knauff suggested, half a century ago, and we have frequently employed, always with good results, a somewhat similar process for introducing a queen. The bees are to be stupified and then confined in any empty hive, provided with adequate ventilation. After the lapse of three or four hours, we introduce a queen through an opening in the top, and let them remain undisturbed twelve hours longer. We then return them to their old hive by setting this on the one containing the bees, and opening the communication between them. The queen will be readily accepted whether fecundated or not; but if the bees were not queenless before their queen must be sought for and removed while they are in a state of stupor.

If a colony be found queenless at any time from the beginning of March to the middle of May, and we desire to preserve it as an independent stock, we adopt the following plan: We stupify the bees after placing the hive on eke five or six inches high. When they have all fallen, we remove the hive and set on the eke another similar one, in which a brood comb containing eggs and larvæ, and another with honey, have been placed, and on which a top-board has been adjusted. Setting them in a dark chamber for twenty-four hours, we, meantime, remove any drone brood and drone comb which the hive may contain, and removing the top-board from the ekes at dark in the evening, we set the hive thereon. The bees will immediately resume possession without deserting the brood-comb below, and, if undisturbed, will

proceed to rear a queen. The hive is, of course, to be replaced on its former stand; and the ekes are not to be removed until the young queen has become fertile. If, in addition to the eggs and larvæ, a sealed queen cell can be given, much valuable time will be gained, if the embryo queen be not destroyed.

Swarm Nomenclature.

The first swarm that issues from a stock of bees in the spring is called the "*prime*" swarm, and is usually the strongest and best which such a stock may be expected to produce that season.

The second swarm, or first afterswarm, is termed a "*cast*," and usually issues from ten to fourteen days after the prime swarm. It is commonly weaker than the prime swarm—that is, composed of fewer bees; and coming later in the season, does not always secure sufficient stores to pass the winter safely. It has the advantage, however, of possessing a young queen.

Should a third swarm issue from the same stock, it is termed a "*colt*," and a fourth swarm is called a "*filly*." These are rare, but when they make their appearance, follow the second swarm, after an interval of only one or two days.

A swarm from a swarm is called a "*maiden*" swarm, and is accompanied by the same queen which issued with the parent stock when it swarmed.

In ordinary honey districts, good bee-keepers generally strive to prevent the production of any afterswarm by adding *supers* to their hives. But as this is not always effectual, they catch and destroy the queen of the young swarm, and let the bees return to the parent stock.

Feeding.

A little food in the spring stimulates the queen to lay more abundantly, for bees are provident, and do not rear the young so rapidly when the supplies are short. In this particular the intelligence of the bees is very striking; they have needed no Malthus to teach them that the means of subsistence must regulate the increase of a prosperous population. Judgment has, however, to be exercised by the apiarian in giving food, for it is quite possible to do *mischief by overfeeding*. The bees, when overfed, will fill so many of the combs with honey that the queen in the early spring cannot find empty cells in which to deposit her eggs, and by this means the progress of the colony is much retarded, a result that should be guarded against.

Any sudden or clumsy movement which jars the combs or frames will excite the bees, and if but one be crushed, the odor of their slaughtered comrade rouses them to a pitch of exasperation. Their powers of smell are very acute. The best time for most operations is in the middle of a fine day.

Fertility of the Queen Bee.

BY THE BARON OF BERLEPSCH.

[The substance of a portion of the following article appeared originally in the series of elaborate essays in demonstration of the truth of the Dzierzon theory, a translation of which was published in the first volume of the American Bee Journal. It was subsequently re-written by him and enlarged, and forms the tenth chapter of his comprehensive work on "*the Bee and Bee-culture*," from which we translate anew.]

That the fertility of a queen bee varies according to season, circumstances, and personal capacity, can hardly have escaped the notice of any careful observer, and we have therefore only to inquire—first, what may be the extent of a queen's productiveness in any case—that is, how many eggs may she be able to lay in a given time, as, for example, in a day? Second, what produces a diminution of her fertility? And, third, what causes it to cease?

This inquiry, moreover, is to be made in view of the well-ascertained fact that a healthy queen has it in her power to lay many eggs, or a few only, or, finally, none. To-day, for instance, a queen in a feeble colony may lay only twenty or thirty eggs; but being transferred to a populous hive, she may in a few days lay two thousand eggs daily, and again, in autumn, none whatever. This augmentation, diminution, and ultimate cessation can only be dependant on the greater or smaller quantity of food which the queen takes. But as in every department of the commonwealth of bees, as I have elsewhere stated, the workers are the guides and controllers, they no doubt here also, under the impulse of their own instinct, feed the queen liberally when they would have much brood, moderately when they would have little, and so sparingly when they would have none, that, though she receives enough to sustain life in health and vigor, there is no surplus available for the production of eggs.

How many eggs can a queen lay?

As regards the productiveness of a queen, it is only necessary to turn over a hive at different seasons of the year and inspect the combs, to see that in May and June, if the weather be fine and warm, and pasturage not too abundant, the productiveness of the queen is most fully developed, and the number of eggs laid daily very large. But how many eggs can a healthy fertile queen, under the most favorable circumstances, lay in one day? Dzierzon says three thousand, as he has found sixty thousand cells supplied with brood in a highly populous hive, "when circumstances were *peculiarly* favorable."

I have made various experiments in relation to this matter, four of which I will here advert to.

1. In the year 1846, the queen of an extraordinarily strong swarm, which I hived when the rape-fields were in blossom, laid 4,831 eggs

in seventy-two hours, which, if deposited uniformly, is at the rate of 1,604 per day. But this case cannot be regarded as settling the question, because before leaving with a first swarm, the queen restricts oviposition, partly to qualify herself for flying, and partly from the want of empty cells; and hence, when coming into a new hive, some time will be required to restore her ovaries to their previous activity. Besides, as in this instance, new combs had to be built, there may not always have been empty cells at her disposal.

2. On the 28th of June, 1850, with the aid of my assistant, I counted all the brood in a large colony. We found 38,619 cells supplied. Hence, assuming twenty days as the average term required for the development of the bee, the queen must have laid, on the average, 1,913 eggs daily. But this case also is not conclusive, because the bees had to build the combs within the preceding three weeks, and the queen may not always have found as many empty cells in readiness as she was prepared to supply with eggs.

I cite these two cases mainly to guard novices, who may be induced to make similar investigations, against drawing erroneous inferences.

3. In June, 1856, one of my stocks had so striking an amount of brood that I resolved to make another enumeration. I did not, indeed, count the cells individually, but calculated the contents by the number of square inches of brood comb actually supplied, which the hive contained, there being fifty cells to the square inch on the two sides of the comb. I thus ascertained that there were at least 48,000 cells stored with brood, which gives an average of 2,400 eggs per day.

4. Shortly after this I introduced a new comb about a foot square in a very populous hive, containing a remarkably prolific queen, which I had seen laying at the rate of six or seven eggs per minute. I placed her gently on this comb, and waited till I saw her lay eggs in the empty cells, and felt satisfied by her demeanor that she would not easily surcease laying. I then replaced the anterior combs and closed the hive. After precisely twenty-four hours I found 3,021 eggs in the cells of that comb. This was a decisive experiment. I now enumerated the entire mass of brood then in the hive by ascertaining the number of square inches in the occupied combs, and found that at least 57,000 cells were supplied, so that the queen must have laid nearly three thousand eggs daily, on the average, within the next preceding twenty days. Nor need this seem surprising, for if a queen lays six eggs in a minute, she will lay 360 in an hour, and three thousand in little more than eight hours, leaving her, of the twenty-four, nearly fifteen hours for rest and recuperation.

But such enormous fertility is certainly rare, and, on an average, a queen will probably not lay more than 1,200 eggs a day even in a very populous hive during the most genial season. There is a vast difference between what a peculiarly prolific queen may occasionally do under specially favorable circumstances, and what an ordinarily fertile one commonly does. And how frequently is a queen prevented from ovipositing by the want of room. Many hives during the best brooding time are so compactly filled with honey and brood from base to apex that scarcely a single empty cell is to be found. Here obviously the queen is constrained to restrict herself to supplying such cells as are vacated by the maturing brood, and even of these the workers will appropriate some in their cagerness to store up honey when fields and flowers yield it superabundantly. I repeat that I do not estimate the average daily deposit of eggs, during the most favorable season, at more than 1,200. In most hives, I am persuaded, it is much smaller.

By what is increased oviposition conditioned?

1. By the personal health and vigor of the queen herself. It can hardly have escaped the notice of even ordinarily observant bee-keepers that there is a striking difference in the fertility of queens, even when they are alike young, and all other circumstances are similar. In April we find two colonies having queens of the same age, alike in quality and equally populous. In May, the one still in *statu quo*, the other ready to swarm.

The most remarkable example of the fertility of a queen which I have ever known is the following: In the summer of 1853 I found clustered on a willow tree a very diminutive second-swarm. I placed it in a hive furnished with empty combs, and was astonished already in the first season by the unbounded fertility of the queen, and still more so when I saw her. She was a perfect giantess, and remarkably light-colored. In the summers of 1854, 1855, 1856, and 1857, she displayed the same enormous fertility; her hive was always the most populous; and it was her that laid the 3,021 eggs in twenty-four hours, though she was then four years old. In 1857, on the 13th of June, she issued with a swarm weighing seven pounds. In the fall she was no longer found, and her successor was much smaller. At a moderate estimate this queen laid at least one million three hundred thousand eggs in the course of her life.

2. By defective limbs, especially crippled feet, which are particularly liable to be injured in casual conflicts; and if a queen loses even one of her small claws, her walk will be unsteady and insecure. From fear of falling she will then hesitate to advance to the lower margin of the combs, and the workers finding that cells remain unsupplied, will cease to build.

3. By weather, season, and plentiful supplies. In our climate, where in May and June nature wears her gayest garb, the fertility of the queen reaches its culminating point. At that time, if the weather is moist and warm, and honey not too abundant, hives having healthy young queens will be literally crammed with brood. That temperature and pasturage, however, do not alone conduce to the profuse production of brood, but that the season also largely contributes thereto, is manifest from this, that in July, when the yield of honey surpasses that of

the preceding months, and the weather is delightful, brooding no longer proceeds as extensively or as energetically as before midsummer.

4. By the age of the queen. Old queens are naturally less prolific than young ones, though exceptions very frequently occur.

5. By size and shape of the hive. Brood is commonly more abundant in hemispherical hives than in quandrangular ones, because in the former all parts of the interior are more equably warmed. It is less abundant comparatively in hives that are broad and deep, and still less in lagers than in standards, because the hinder portion of the lager hives is cooler, and the brooding space is consequently restricted to a narrow space. Naturally, too, in hives of the same shape or form, those largest in size will ordinarily contain the most brood.

6. By warmth and ample store of honey, at a time when flowers and blossoms dispense no nectar. Warm hives and rich supplies of honey, with plenty of pollen, and ready access to water, greatly promote brooding, particularly in the spring.

7. By populousness. The queen of a strong stock will produce proportionally much more brood, and commence brooding earlier, than one connected with a feeble colony, because a certain degree of heat is required which a populous stock readily generates, maintains, and diffuses in all directions within the hive. And if there be a want of laborers to build, repair, and cleanse cells, and to cover and nourish the brood, the most prolific queen will be unable to develope her fertility to the same extent as might be feasible under different conditions.

8. By the kind and quality of the combs which the hive contains. Colonies with new clean worker combs will contain a larger quantity of brood than such as have old combs, black or mouldy, and partially composed of drone cells.

9. By the number of empty worker cells the combs contain. This is natural, for when empty cells are wanting, the queen has small chance to display or develope her power of ovipositing. This deficiency of cells usually occurs just before the departure of the first swarm; and this fact explains how it is that the old queens, with uninjured wings, which accompany the first swarms, are so well able to fly, though the fertile queens accompanying driven swarms are scarcely ever able to take wing. The former have no empty cells within reach for some time before the swarm leaves, and hence repress their energies, and thus become slender and agile. The other, taken unawares in the full discharge of her functional duties, is unprepared for the change, heavy and clumsy, and disqualified for flying.

What causes a diminution of the queen's fertility?

This question has already been in great part answered indirectly in the preceding remarks. I shall merely subjoin that in August there appears to be naturally a very considerable reduction of brood. Stocks which have not produced swarms, and early first swarms also, often have none whatever from about the middle of September. In the beginning of October I seldom found any in my hives, and from the middle of October till Christmas none whatever, except in cases where the bees had been liberally fed with liquid honey. This latter fact of course proves no more as to the natural condition of stocks, at that season, than the blossoming of a fruit tree in a conservatory proves in regard to out-door fruit culture. Frequent disturbance, which temporarily incites the bees to action, may also cause the production of brood at this ungenial season, unless the cold be very severe, or the hive be in a sheltered location. In the mild winter of 1856, Dzierzon found brood in several of his hives in the month of December. In such winters, very populous stocks, well-supplied with honey and pollen, will usually have some brood about the first of January, and almost invariably towards the end of that month. Weak stocks commence brooding much later; many of them not before the middle of March.

What causes the total cessation of the queen's fertility?

With advancing age queens become gradually less prolific, and the brood is no longer so compactly placed in the combs, as at first. Finally ovipositing ceases because the ovaries supply no more eggs. But mechanical causes may also prevent laying, or make it difficult. Thus an accumulation of fœces in the rectum may surcharge the abdomen, and prevent or at least obstruct the passage of the eggs in the oviduct.

But queens, barren from superannuation, are rarely met with, because they commonly die naturally before their ovaries are entirely exhausted, or are killed by the workers when a diminishing production of brood shows that their natural force is abating.

Tallow-tree of Algeria.

This remarkable tree, a native of China, and called by botanists *Croton sebiferum* or *Stillingia sebifera*, has now been successfully acclimatized in Algeria, through the exertions of the French Government. Its cultivation would diminish the cost of candles. A tree ten years old, according to *Galignani*, yields from one to two kilogrommes of tallow; fifteen years later it would yield from three to four. It requires no care or watering, and may be planted on the road side. In the island of Chusan large quantities of oil and tallow are extracted from its fruit. In hot weather the candles made with the tallow are apt to become soft and even liquid, but to guard against this inconvenience they are dipped into melted wax.

HONEY, like most vegetable products, should be fresh every year. It may easily be kept from one season to another; but when kept beyond that time, unless very carefully stored in a warm temperature, it will crystalize in the comb; and it is liable to ferment when in jars separated from the comb.

The Wax-tree of Japan.

On this remarkable plant, the *Rhus succedanea* of botanists, the *Bulletin* of the Society of Acclimatization of Paris, publishes an interesting paper by M. Eugene Simon, now at Nagasaki. The vegetable wax of Japan is one of the chief articles which that country exports. It is not exactly of the same nature as common bees-wax, since it melts in summer at the ordinary temperature of the air. But this inconvenience is obviated in Japan by protecting the candles made with this wax by a coating of bees-wax. It appears that in England a process has been discovered for increasing its consistency, since the demand for the article from that quarter has considerably increased of late. The tree itself might easily be acclimatized in the southern parts of France and the United States. It thrives on mountains and in stony and barren ground unfit for other agricultural purposes. Mr. Simon has sent about twenty kilogrammes of the seed to France for trial. The young trees are planted in Japan along the highways, when they are two years old, leaving a distance of about three feet between the stems; but if planted in squares, the distance must be double. The trees are kept low by lopping, and trimmed in the shape of pyramids. In the fifth year after planting, each tree yields on an average four pounds of seeds; in the eighth year, six pounds; in the tenth, eighteen pounds; in the twelfth, forty pounds; in the fifteenth, sixty pounds. In the eighteenth year the tree enters upon its decline. Four hundred pounds of seed yield one hundred pounds of wax. At present, one hundred pounds of this wax are sold in London for two pounds, ten shillings, so that a plantation of 10,000 trees in their prime would produce 4,000 pounds. The seed is gathered toward the end of autumn, threshed, and then left to dry about a fortnight, after which it is slightly roasted. It is next crushed under a mill-stone, and the produce exposed to the heat of steam, in canvass bags. The wax is then obtained by the action of a screw press. This wax is of the third or lowest quality; to bleach it, it is rasped, rinsed in water, and then exposed to the action of the sun and dew for three days. A still higher quality is obtained by repeating the operation.—*Illustrated London News.*

If the weather be wet the next day or two after hiving a swarm, it will be well to give a little assistance to the new colony in the shape of food, for, though when a swarm leaves a hive almost every bee composing it fills itself with honey, we have known not a few instances, in case of very wet weather, in which the whole swarm perished from starvation for the want of this little timely help. Of course, the first work of the bees is to build themselves combs, and these combs being produced by the secretion of wax from honey, a great drain upon their resources immediately begins; and any little outlay at this juncture is abundantly compensated by its enabling these industrious emigrants the more quickly to push forward the furnishing of their new home.

[From the Agricultural Report for 1865.]

Changing from Common to Italian Bees.

The ease with which this is accomplished brings Italian bees within the reach of all, in every part of our land. Pure queens are raised by reliable persons, and sent, as ordered, anywhere with perfect safety. If it was necessary to purchase and transport full colonies, the work of introducing the new variety would be much more difficult and expensive. Now, any one who is convinced that the Italians are better and more profitable can order one or more Italian queens, and from them raise others to supply all his hives. Many and full directions have been given how to Italianize, but still the plain, simple way seems to be little understood. Having been engaged in the work for three seasons, I shall try to give some hints which may be valuable to those commencing in it.

The queen being the mother of the whole colony, it follows that if a pure Italian queen be given them instead of their own, all the bees reared after the change are Italians; and as the bees already there die off, they are replaced by the others, and the stock, in a short time, is fully Italianized. By a *pure* queen, I mean one of pure stock, and which has been fertilized by an Italian drone. There has been much stock reared in this country which is *hybrid*. By this I mean the progeny of a pure Italian queen fertilized by a common drone. This, in in the *first generation*, is hard to be distinguished from the pure; but it soon degenerates. As the drones are *invariably* like their mother, those reared from such hybrid queens are *always pure*. This fact should be borne in mind, as it makes it comparatively easy to keep the stock right.

The queen with which you commence should be pure beyond doubt. Purchase of some one who will warrant her, and whose guarantee you can trust, remembering that in the beginning you will be no judge of their purity. The fall is the best time to purchase your queen, because she will then be ready for early operations the next season. Introduce her into the best and strongest colony you have for safe-keeping through the winter. If you have but a few colonies, the work for the next spring is very simple. About the middle of May, if you examine the hive containing your Italian queen, you will find drones in all stages. Then take the queen out and confine her in a cage made by rolling a piece of wire cloth, four inches square, into a tube, tying it firmly, and putting a wooden stopper in each hand. Next remove from another hive its queen, and having killed her, insert the queen cage between the two frames, and keep her there forty-eight hours. Then release her, and that hive has an Italian queen. The one from which you took her will preserve its pure drones with care, and immediately proceed to rear queens. In ten days you will find from six to twelve cells nearly ready to hatch. Then take from as many hives as you have queen cells their queens, and leave them queenless about ten or twelve hours. Then from one of the hives take

a centre frame containing brood, cut a hole two inches in diameter; cut one of the queen cells from the hive containing them, with a little comb each side of it, being very careful not to press or injure it in any way; dip the edges of it in a little melted wax, and insert it in the frame, and put it back in the hive. In nine cases out of ten this cell will be gladly received by the bees, and hatch in a few days. This process can be repeated with as many hives as you have cells, and if done by the last of May or first of June, you may be quite sure that these young queens will be fertilized by Italian drones, *because you will have no others in your apiary so early in the season.* One or more cells must be left in the hive where they are reared, that it may be sure of a queen; and all your hives should be examined, from time to time, to see that the cell in each hatches, and then to be sure that the young queens all lay at the proper time.

I usually find them depositing eggs between the third and twelfth days after they hatch. If any colony fails to secure a fertile queen in this way, insert into it from the hive, which now contains your Italian queen, a frame containing eggs, and from that they will rear others. Before doing this, look over all the frames carefully to see that they have not commenced cells from their own eggs.

After you have a fertile queen in each hive, watch the young worker bees as they hatch, and if all, or nearly so, are slender in form, and have three distinct golden rings, you may *hope* they are pure. If there is a doubt about any one, you can exchange it for another at your leisure. Bear in mind that the main thing the first season is to get a young queen in every hive, *reared from the one you purchased.* That accomplished, all your drones will afterwards be pure, and young queens reared from that time forth will be quite sure to meet pure drones.

The following spring your hives will have drones in them two weeks in advance of all black bees in the neighborhood; and if yours are strong, and you make early swarms, the chances are much in favor of your queens being purely fertilized.

The second season of your operations all doubtful queens should be replaced; and if pains be taken you can easily have none but pure queens in your hives while the original queen which you purchased lives. I find the temper and disposition of the bees a better test of purity than their markings. The Italians are more easily managed, and less easily provoked to anger. If you open a hive of them and lift out a frame, instead of flying about in all directions, and getting in a rage, (as do the black bees,) hardly a bee leaves the comb—all cling to it quietly until it is replaced. Where you find them thus clinging to the comb, you have one good mark of purity.

The only *certain* test that I rely upon is the color and markings of a queen's *royal* children, or the queens reared from her. The female bee is invariably like the father, and the queens are the only *perfect* female bee. If you rear queens rom a queen, and they are well marked and colored, you may be sure she is purely impregnated.

I had a number of fine queens last season whose worker progeny was so well marked that I had little doubt of their purity. Yet, on rearing queens from their eggs they were not like their mother, and *their* eggs, when tested, produced queens hard to be distinguished from common ones. This fact will explain why the Italians, in careless hands, so soon degenerate. There is no need of this if the queen you purchase is pure, and you take pains the *first* season to put a queen reared from her into every hive you have; and, in the *second* season, to replace all which show impure marks.

The most difficult part of this process, as I have described it, (and it is more easily done than described,) consists in finding the old queen. At swarming time (the best season to do it) the hives are or ought to be populous; and to the beginner it seems a formidable operation to look the frames over, and find one bee among so many. Place an empty hive by the side of the one you wish to examine; after opening the latter very gently, sprinkle it well with sweetened water. It is better not to alarm them by the use of smoke when you wish to find the queen. Begin near the centre, and take out a frame, and look carefully on each side of it. If she is not on it, put it in the empty hive, and take out another, proceeding in the same way. If the queen is found on neither of them, spread a sheet before the hive which now contains the frames, and empty upon it the bees that remain clinging to the hive. If she is among them you will see her as she passes into the hive. If you do not find her, return the frames to the other hive, examining them with care. I have often found the queen on the first frame I took out; and then, again, have taken them all out three times before seeing her. There is little difficulty in finding Italian queens; they are not disposed to hide, and their bright color make them very conspicuous.

Those who are Italianizing large apiaries, or rearing queens for sale, need no advice in the matter, yet may be interested in some items of my experience. I have succeeded better in rearing queens in moderately large hives than in the small ones generally used for the purpose. I now have my nucleus hives containing three frames, the size of my large hives. A hive containing twelve frames, which can be divided into four parts, at will, is very convenient, the entrance into two of the parts being at the ends, and in the others at the sides. Such a hive is warmer than a single nucleus, which is important in the early part of the year.

If such a hive contains a pure Italian queen, and she be taken from it in May, there will be eggs in each of the four parts when the dividers are put in, and from thirty to forty queen cells will be started at once. In ten days as many of these as you please can be cut out and given to other hives, but four or more should be left in it. The young queens hatched in these hives are very sure to mark their place when they go out for their excursions, as the size and entrance make it peculiar in appearance.

Much complaint is made that the whole colony is apt to go out from a nucleus hive when the queen leaves for impregnation, and does not return; thus queen and all are lost. There is a sure remedy for this. Bees never desert a hive, large or small, while there is brood in it. If, then, a frame containing eggs and larvæ be given to the small colony from another hive, about the time the queen will hatch, the bees will not desert it. Some have trouble in making the bees build more than one or two cells in these little hives. That is because they do not have a large proportion of *young* bees in them. The young bees of the current year are the ones that work the wax and build queen cells. They may be seen before they are twenty-four hours old at work on them. Keep plenty of bee-bread and honey in the small hive, and supply it with water and young and hatching bees, and you will have numerous cells.

Be always sure that, in the hives where you are rearing queens, there are no eggs except from a queen of undoubted purity. It has been declared impossible for bees to remove their eggs from one cell to another, but I now know that they do so. Last year I put into nucleus hives, each, a frame containing eggs, while the other combs, full of honey and bee-bread, were those preserved from hives from which the bees had been taken, and which had been all winter in a cold room. By no probability could an egg have been in these, yet repeatedly were queen cells built in them, and perfect queens hatched from them. I do not pretend to say how the bees remove so delicate a thing as one of those little eggs without injury; but is it really any more wonderful than some of their other operations?

I have reared queens every week from the 1st of April to the last of October, and could perceive no difference in size or coloring at the different seasons; but out of eighteen reared in April last only two became fertile; and of twenty-two reared in October, all but four were lost, while nearly all those reared In May, June, and July were impregnated.

I do not find the pure Italian queens larger in size than the common ones; but queens reared from a pure Italian mother, fertilized by a common drone, are often very large and handsome. The colonies of such queens are, in every respect, equal to the pure. All such queens may be safely preserved, as *their drones are pure.* But no queens should be raised from them, and if swarms issue from their hives, the queens should be taken from them and pure ones given them, for nothing pure comes from a queen reared from such queens.

No one should be contented to stop short of giving a queen which will produce pure drones the first season to every hive he has, whether it be one or one hundred. This accomplished, your work is more than half done. The importance of this is manifest, for you will then have no common drones in your apiary the second season. When this is the case, you can keep your own colonies strong, "swarm" them early, and have little to fear from outsiders.

So long as you have common drones, a large proportion of your queens will meet them. I raised one hundred and forty-three queens the first season, which became fertile, and though I had many Italian drones in a dozen hives, and suppressed the common drones as much as possible, only twenty-six of my young queens were fertilized by Italians.

It is said, and I doubt not with truth, that in all Italian stock brought to this country, there is a taint of impurity. This is of little consequence if we keep our stock pure. By exercising proper care, we can not only keep them as good as the original, but also do much to improve them. I have several young queens even more beautiful than those I bought, and queens reared from them are as fine as any I have ever seen. Every one which does not produce pure drones should be replaced as soon as this is discovered, and those which are only hybrid may be changed before swarms are taken from them. All this requires care and patience, but it pays well to take this care.

In no way can the yield of honey be so sensibly increased as by introducing the Italian bee into different localities. As it replaces the old variety a great change will be observed.

I cannot think it wise for those rearing queens to sell to send out any but those attested and proved pure. The practice of selling hybrid queens, or of sending those not tested, to those who are commencing in the business, promising to replace them if not pure, is a bad one. The beginner (who, perhaps, has never seen an Italian bee) cannot himself be a judge of purity, and in nine cases out of ten will be satisfied with what he gets, and rear from it. Though he will find any mixture of the Italian blood an improvement on his old stock, yet, in the second generation, he will have nothing pure, and be disappointed and discouraged. One had better pay a large price for a queen warranted pure by one whose reputation is at stake in the matter than to get a hybrid cheap, and find, in a year or two, that he has all his trouble for little or nothing. I would advise every one purchasing a queen to clip her wings before putting her in a new home. It not only prevents her leaving the hive with a swarm at any time, but you are always sure that she is the one you bought, for bees often destroy a queen for no apparent reason.

SINGULAR as it may appear, there is no tribe of insects which—like the ox, or sheep, or other hoofed animals—can be termed absolutely domestic, or capable of administering, in a direct way, to the wants of man. And yet a little consideration will show us there are many strong points of analogy between the ruminating quadrupeds and the bees. Both are the most gregarious of their respective classes—the elephant in one, and the hive-bee in the other, show us the highest development of instinct in the animal creation; and if the latter does not spontaneously yield us its honey, it will yet inhabit those artificial mansions we prepare for securing its sweets, so that, in some degree, it may be said to be not only a social, but a somewhat domesticated insect.

The Egyptian Bee.

Part IV.

How I obtained and introduced it into my apiary.

As soon as I had ascertained the fact that the Egyptian bee had actually reached Germany, I lost no time in putting myself in communication with Herr Vogel, to whom the Berlin Acclimatization Society had deputed the task of multiplying and disseminating these interesting strangers, and in due course received the following two letters from him, the first being dated the 2nd July, 1865:

"Mr Woodbury: I am very much honored by the charge given me of sending you a fertile Egyptian queen bee.

"It may be permitted to me to inform you previously that I will despatch a very fine queen bee with its necessary companions on the 15th of July.

"The transport will be the happiest if the queen bee has only few companions. Therefore, having received this letter, I propose to you depriving a few populous bee-hives of its mother bee, and destroying, after nine days, all mother-cells. This bee-hive resting, deprived of its mother bee, you may make use of it to strengthen the new comers.

"You wish being informed if the Egyptian bee (Apis fasciata) coupled itself with the northern and Italian! Apis fasciata is a constant stereotype variety of Apis mellifica. Its temper is very lively, and its voice higher than that of Apis mellifica. Therefore the virgin queen bees of the Egyptian race flying out choose regularly Egyptian mates. It will be also easier to keep this race genuine than the Italian bee (Apis ligustica).—Your affectionate, addicted bee-friend—F. W. Vogel."

The second letter was dated the 15th July, but did not reach me until the 28th, and an examination of the Prussian post-mark showed that it was not posted in Germany until the 25th. It heralded the approach of an Egyptian queen in the following terms:

"Mr. Woobury: You receive adjoined a fertile Egyptian mother bee. The Egyptian are covered with fair hair, and have a yellowish shield on the breast-plate.

"Is winter coming on, I advise to put the Egyptian bee-hive into a quite dark room where they cannot freeze to death; in such room the bee-races winter generally the best.

"If the queen bee arrives dead, against all my expectations, it may be permitted to me to send you another which is not to be paid.—Your affectionate, devoted bee-friend—F. W. Vogel."

The result of this correspondence was, that on the 30th of July I received a somewhat weighty deal box, 12 inches long by 9½ wide, and 8½ inches deep, which, in addition to my address, was ornamented with sundry printed labels, one of which declared it to be "aus Zechin," and another "par Ostende." There was also in one corner a rough pen-and-ink sketch of a drinking-glass, meant, I suppose, to convey the intimation to railway porters and all whom it might concern, that the contents of the box were of a like brittle character, and under this cartoon, for the edification of German as well as of English readers, appeared in three lines, thus—

"MIT SORGFALT!
"WITH CARES!
"EGYPTIAN BEE!"

The two first lines being likewise repeated on the three remaining sides of the rather large label which concealed fully two-thirds of the box cover.

On applying my ear to the wire cloth which covered an aperture for ventilation, I was somewhat concerned at finding all within as still as death, nor could I by tapping the sides of the box elicit the slightest response from the little prisoners, whose answering hum is usually so prompt and ready under such circumstances. It was therefore with no little trepidation and misgiving that I sought for tools and set to work to prise off the well-secured cover, which, like the box itself, was made of wood nearly an inch in thickness, the latter being dovetailed together, and of such strength as might well have fitted it for the conveyance of bullion from the Antipodes, instead of merely the safe custody of a few hundred bees. On raising the lid a small cluster adhered to it, having apparently removed themselves as far as possible from a large square piece of dark-colored honeycomb, out of all proportion to their wants, a portion of the contents of which having escaped had so clogged and soiled the unfortunate little prisoners, that few indeed were able to use their wings. On separating and carefully examining this cluster, I found it to consist of worker bees so similar to Ligurians that I could not at that time detect the slightest difference, two or three small but very handsome drones, the whole being in a sad plight, and what seemed to me to be a diminutive Ligurian queen in nearly as bad a case as the rest. This certainly appeared extremely small change for my outlay, and it was with no very pleasant feelings or agreeable anticipations that I proceeded to make the necessary attempt at placing my forlorn Semiramis at the head of a small lot of Italians, which, having themselves failed in the attempt to raise a queen, appeared more likely than any others to tender their allegiance to an alien monarch. I, of course, took the precaution of presenting to them this aspirant to the vacant throne in a queen-cage, through the bars of which her future subjects were at liberty to make her acquaintance, and well was it that I did so, for dire was the onslaught made upon her bedraggled attendants which I added to the Ligurians at the same time. "Italian Unity!" or whatever may be its apian equivalent, was at once vociferously buzzed forth, and perseveringly and relentlessly reiterated, as one by one the unhappy Egyptians were dragged out, untill their expulsion was at last as absolutely complete as that of their fellow-Africans, the Moors, from Spain by the warlike Ferdinand and Isabella of Castile.

This was in truth an unpromising commencement, but I could do nothing to calm the strife which continued nearly until the sun went

down, and it was with gloomy forebodings that I witnessed the massacre—contest it could not be called—and beheld the ground in front of the hive strewn with dead and dying bees.

Still I hoped that the animosity of the vindictive Italians might be satiated with the slaughter of her worker attendants, and that they might yet tender their allegiance to the captive Semiramis, whose dynasty might by their means be perpetuated in Great Britain; nor were my favorable anticipations entirely vain. On examining the interior of the hive the next morning, I found the hostile demonstrations of the fiery Italians so far moderated and subdued as to induce me to set the imprisoned monarch at liberty. Remaining unmolested, and being followed only by admiring and caressing antennæ in this her first royal progress in her new domain, I was encouraged to hope for the best, and successive examinations during the same and following days proving to my satisfaction that she indeed reigned in the affections of her alien though adopted children, I set myself by the careful selection and gradual addition of ripe brood-combs, so to increase the population of the hive as to admit of the propagation of Apis fasciata before the season, already so far advanced as to make success improbable, should be so far passed away as to render it entirely hopeless.—A DEVONSHIRE BEE-KEEPER.

[TO BE CONTINUED.]

The Candleberry Myrtle.

Myria Cerifera is the subject of a paper by Mr. G. E Moore, in Silleman's *Journal of Science*. He states that it is a hardy plant, thriving best on poor soils near the sea, and producing abundant crops. Its fruit yields a wax, which, under the names of myrtle wax, candleberry wax, and barberry tallow, has been for some time an article of commerce to a limited extent in the United States. The wax occurs as a white incrustation on the small globular nuts of the plant. To obtain it pure, the berries are inclosed in bags of coarse cloth, and immersed in boiling water, until the fused wax collects on the surface. It is then poured off into pans, in which it solidifies on cooling, when it is fit for market. Its chemical composition was found by Lewy to be—carbon, 74; hydrogen, 12; and oxygen, 14. It is found to be the most accessible source known for pure palmitin and palmitic acid. In illuminating power it is scarcely inferior to the best bees-wax, whilst it can be produced at less than one-fourth the cost. It also forms an excellent soap. As a substitute for bees-wax, Mr. Moore considers that the myrica wax has not received due attention, and says there is no reason why increased cultivation should not constitute this wax an important article of commerce. Further details will be found in the *Journal of Science*.

WHAT person, in fact, whether naturalist or not, who knows anything of the bee or the ant, would ever think of classing them in the scale of creation as inferior to a spider, a wood-louse, or a scorpion?

For the American Bee Gazette.

Do Bees Freeze to Death?

From the great stress that most writers lay on wintering bees by housing them, or otherwise keeping them warm, one would be led to suppose that they would die from extreme cold. Is it so?

On the 24th day of December, 1864, in passing near my bees, I noticed one hive had been thrown down from its stand, and, in falling, the top was split, and about one-third of it entirely knocked off. It was a common box hive, 12x12x12 inches, or just one cubic foot inside. It was laying on its side on the ground, thus exposing the bottom of the comb, and about one-third of the top of the comb. The weather being warm, the bees were flying about very much excited, and when I approached them to replace it on its stand, they attacked me so furiously that I concluded to wait until night. I was that evening suddenly attacked with rheumatism, and did not again get out of the house until the middle of March. I had not, during that time, thought of the bees. It was the coldest winter we have had here in many years. The thermometer marked as low as 18° below O. Snow fell to the depth of 15 inches, and must have blown through the hive, as the bottom of the hive was facing the northwest. In the classic language of the poet—

> "It snew and it blew,
> It friz and it thew,
> And it blew and it snew,
> And it friz and it thew again."

When I got out I thought of my poor bees, and hobbled to their *stand*, or rather "*lay*," and was astonished to see that they were alive and working vigorously out of both ends of the hive. I righted them up, and from them I got the first swarm of the season, out of twenty hives, and two after-swarms, and took from the cap about 25 pounds of honey, and from the first swarm I took two boxes of 10 pounds each, besides two other boxes partly filled—say 5 pounds; in all 50 pounds. I had but one or two other swarms that yielded so much. Can you imagine a severer test of the ability of bees to withstand cold?

While I would not recommend wintering bees by knocking them off their stand, and splitting one-third of the top off, and let the wind and snow blow through them all winter, yet I think there is a great deal of nonsense written about bees being kept warm in winter. A strong colony will winter in a box-hive made of boards one-half inch thick, in the open air, in Siberia; while a weak swarm might not stand a single Nor'wester in Texas. *Keep your colonies strong, and they will take care of themselves.*

Yours, &c.,

D. L. ADAIR.

HAWESVILLE, KY.

IN the aculeated division of the *Hymenoptera* order of insects, there is a tangible character whereby the sex of the individual may be discriminated, for the males have one joint more to the antennæ and the abdomen than the females.

THE AMERICAN BEE JOURNAL.

WASHINGTON, JANUARY, 1867.

☞ THE AMERICAN BEE JOURNAL is now published monthly, in the City of Washington, (D. C.,) at $2 per annum. All communications should be addressed to the Editor, at that place.

☞ THE subscription list and good will of the "*American Bee Gazette*" having been transferred to the editor and proprietor of this Journal, the papers have been united, and will henceforward appear under the combined title of the "AMERICAN BEE JOURNAL AND GAZETTE." It is hoped that this arrangement will be satisfactory to all interested, and tend to secure the permanent establishment in this country of a periodical devoted to bee-culture.

Our chief endeavor has been, as it will continue to be, to render available to our readers everything new and valuable in practical and scientific bee-culture, furnished by the German journals devoted to this speciality. Those publications are increasing in number and interest, and still constitute the only source from which a satisfactory knowledge of the progress making in Europe in this regard can be derived, as no similar periodical is published in England. Having these at command, and receiving besides, as they appear, all the new publications emanating from the most eminent and experienced apiarians abroad, our supplies of material will be ample. Yet we earnestly desire, and respectfully solicit, from the correspondents of the JOURNAL AND GAZETTE, a continuance of their contributions as heretofore. These are always perused with peculiar zest by apiarians, and many of them show that while American bee-keepers are not less observant than their foreign compeers, there is frequently more shrewdness in their suggestions and more ingenuity and directness in their processes.

The AMERICAN BEE JOURNAL AND GAZETTE will henceforward be issued on the first day of each month.

☞ THE report of the Commissioner of Agriculture for the year 1865, lately published, contains an interesting article on bees and bee-culture, written by Mrs. Tupper, of Brighton, Iowa. We have extracted from it, for this number of the BEE JOURNAL, a section on Italianizing common stocks.

☞ The following article contains a singular blunder, which, we presume, is to be attributed rather to the ignorance of the reporter than that of the "President of the Entomological Society" of London. The *Braula cæca* is a parasite of the bee, rather apt to infect queens, rarely if ever proving fatal, and certainly never directly "destructive of the honey in bee-hives:"

MR. Waring has exhibited to the Entomological Society some dead pupæ of drones which he found near the entrance of one of his bee-hives. They were not fully matured, and it would seem that the bees must have cut off the caps of the cells, and cast out the dead pupæ; but he was unable to throw any light upon the cause of their death.

The President of the Entomological Society has exhibited specimens of the *Braula cæca*, which, on the Continent, has been found to be destructive of the honey in bee-hives. It had only recently been found in this country, and had been imported with the *Apis ligustica*, in a hive of which species the exhibited specimen had been discovered.—*Tims'* "*Year Book of Facts*, 1864.

☞ THE subjoined paragraph shows that some folks in England have yet much to learn respecting the "puzzle which has exercised the wits of naturalists and philosophers for many ages." Professor Leitch will have to reconsider and reconstruct his "new theory."

Queen Bee.

Prof. Leitch has announced a new theory in the Queen Bee, a puzzle which has exercised the wits of naturalists and philosophers for many ages. How is a queen bee produced from an egg, which, under ordinary circumstances, would produce a sterile worker? It is commonly supposed that this change is effected by the supply of a peculiar food (a "royal jelly" it has been termed) to the larvæ. Prof. Leitch considers that the change is effected by an increase of the temperature of the cell containing the larva intended for the production of a queen bee, and that the object of the isolated position of the royal cell is to admit of it being surrounded by a cluster of bees, who, by their rapidly-increased respiration, produce the warmth necessary to accomplish the growth of the queen.—*Athenæum.*

Extract from a Letter to the Editor.

"The December number of the French Bee Journal announces the departure of a colony of native bees from the Island of Bourbon or Reunion—the Apis unicolor—and wishes them a safe arrival in France. If successfully introduced there, we may have them in the United States by next autumn."

[From the Agricultural Report for 1865.]

Alsike Clover.

[Translated from the "Hand-Book of Swedish Agriculture," by J. ARRHENIUS, Secretary to the Royal Academy of Agriculture, and late Superintendent of the Ultuna Agricultural Institute.]

ALSIKE CLOVER (trifolium hybridum) is a pale-red perennial species of clover, which, mixed with grass, is cultivated with great advantage on permanent grass land, whether employed for pasture or mowing. This species of clover thrives best on marly clay with a somewhat moist bottom.

Alsike clover has obtained its name from the parish of Alsike, in Upland, where it was first discovered, and where it grows in the greatest abundance in every field ditch. Besides this, it is found wild with us from Skane up to Helsingland, and also in Norway and Finland, where, on fallow land, we have seen it growing luxuriantly. This species of clover is consequently native to our country, and proves itself, both here and in the border countries, to be a hardy plant, especially adapted to cultivation in our rigorous climate. It was not until the beginning of the present century that this species of clover was cultivated by us, and in 1834 it was introduced into England by Mr. George Stephens, under the name of *Alsike clover*. Both by this name, as well as by that of *Swedish clover*, it is now known not only in England and Scotland, but also in Denmark, Germany, and France, into which countries it is now annually imported from Sweden.

This species of clover has pale red flowers, a somewhat lank stalk, and oval obtuse leaves, which are less and of a lighter green than those of red clover. The flower-head, growing from the upper leaf joint, is globular, and formed of fragant blossoms supported by stems. Those blossoms are at first whitish and upright, and subsequently of a pale red, which when the flowering has passed, become brown and somewhat bent. The calyx is smooth, and its tags of equal length. The seed pods, containing three or four grains of seed, extend out of the calyx, surrounded by the withered crown. The seed is much less than that of red clover, is in the form of a kidney, and dark green or verging somewhat towards violet. Yellow green seed of this plant is not ripe.

Alsike clover does not attain its full luxuriance until the second or third year after it has been sown, and during the first year seldom arrives at any great degree of growth. It is therefore best adapted to mixture with grass, for permanent grass land. It yields, on suitable and fruitful soil, rich and good fodder. It loves clayey soil, especially marly clay, with a somewhat moist position; but it also thrives on cultivated fens and marshes. Alsike clover grows but little after mowing, and no second crop can be expected from it, as is the case with red clover. Both in this respect, as well as in the longer time it requires before it yields a full crop, Alsike clover stands after red clover. Its great and undeniable advantage, on the other hand, lies in the fact that it is far more *hardy* than red clover, and can be cultivated on moist soil, and land that is flooded at certain times of the year, on which red clover will not grow. If Alsike clover be mixed with white clover and suitable grass, it yields rich and certain crops, and when cultivated on arable land common red clover may and should be mixed with the seed with which the field is sown, by which the great advantage is gained that, the first year after sowing, two crops of fodder may be gathered, chiefly consisting of red clover; and that the following years, in the same proportion as the red clover declines the Alsike clover appears in its place, and yields rich and certain crops, together with the grass with which it is sown.

With reference to cultivation and tending, the same prescriptions will apply, in the main, that are usually given with respect to red clover, with the addition of the following: Alsike clover, in full vegetation, has a great tendency to lodge, it should always, when cultivated for fodder, be sown together with grass—by preference with meadow or fox-tail grass on marshy land, and with timothy grass on drier soil. The crops by this means become much richer, and the grass supports the Alsike clover, so that it does not fall down to the ground and rot.

As Alsike clover seed is not more than about half the size of red clover seed, no more than about half as much, in measure, of the former is required as of the latter, and may be sown winnowed or in its pods like red clover. Every farmer will soon learn by observation what quantity of seed is required to the acre. If he uses the unwinnowed, or seed in the pod, the quantity required is four or five times greater than if he used the clean seed.

The quality of grass and other kinds of seed that should be mixed with Alsike clover in sowing, when it is cultivated for fodder, we will specify below. Alsike clover seed, both winnowed and unwinnowed, may be sown in the autumn, directly after the sowing of autumn grain, or in the spring. When the seed is unwinnowed it is considered best to sow it in the autumn; it may, however, also be sown in the spring on the last snow. From the time Alsike clover first began to be cultivated by us, it has been found "the unwinnowed seed produces a stronger growth than the winnowed," which has been rightly attributed to the fact that "the tender shoot derives, in part, its first nourishment from the husks that surround the seed." (Annals of the Academy of Agriculture for the year 1819, 2d vol., p. 223.)

The yield of mixed grass and Alsike clover seed is, on good and rich soil, very considerable. Lundstörm (Hand Book for Farming, p. 294,) considers that it should yield, with certainty, from two to three tons per acre. At Frötuna, in Nerike, in four years, one of which was a very dry year, the average yield was nearly two tons of Alsike clover and timothy hay per acre; the largest crop, on well manured and lime-strewed soil, amounted to between four and five tons per acre, (Farming Transactions, 2d vol., p. 104,) a yield that certainly cannot be expected, excepting on very rich soil and in

rainy years, in which Alsike clover especially thrives and attains much greater luxuriance than in ordinary dry summers. It yields, however, in general, good and safe crops, and both in the middle of Sweden, (especially in Nerike,) as well as at several places in Upland, Gestrickland, and Helsingland, Alsike clover mixed with grass is prized as being far more reliable than red clover. Alsike clover yields, too, better and finer hay, and, when ripe, the stalk is not so hard as red clover.

Gathering the seed of Alsike clover demands espedial care, as it is of importance to gather seed for home use; the purchase of such seed being always connected with considerable expense. In addition to this, however, the gathering of Alsike clover seed for sale may be attended with considerable profit, it being in great request in the foreign markets, and fetching high prices. It is also well known that the gathering and sale of Alsike clover seed is now prosecuted on several estates as the main object, and it is desirable that the production of this seed for sale were more generally carried out, as from it might be derived a very profitable article of export.

On one estate in Sweden, where twenty acres were set apart for raising the seed, the average annual production for five years was 133 pounds per acre, while the production one year was 200 pounds per acre. When it is recollected that Alsike clover seed generally obtains in the market about double the price of the red clover seed, it is evident that the gathering of the former seed must render a very handsome return.

Alsike clover seed is more easily threshed than red clover seed. When cultivated and threshed together, the Alsike clover seed always comes out of the pods before the red clover seed. The ripened seed-head of Alsike clover, however, falls off easier than that of red clover, and therefore in mowing Alsike clover that has been allowed to ripen, still greater care must be taken than with the seed of red clover.

The mowing of ripe Alsike clover should always be effected either early in the morning or late in the evening, while it is moist with dew; otherwise the riper seed pods fall off with the best and finest seed, however carefully the mowing may be performed. The mowed Alsike clover is left lying as it falls, and is turned once or twice while moist with dew, after which it is housed when dry. In carting home canvass lining should be used in the carts, of sufficient size to cover the whole of the bottom and a part of the sides of the carts, so that those seed pods that fall off in carting may not be lost.

If Alsike clover be employed for home use, it may, as mentioned above, be used unwinnowed or winnowed, and if in such case it be mixed with the seed of red clover or timothy grass, no injury would be caused, as, for the reasons before stated, the seeds of these plants may in any case be advantageously mixed with the seed of Alsike clover. If Alsike clover seed is to be sold, and especially if it is to go abroad, it should be perfectly clean and free from admixture with other seed. Every grain of seed found amongst another kind of seed which is intended to be perfectly winnowed, must be considered as weed seed, and the worst weed in Alsike clover that is left to ripen is timothy grass.

Red clover seed may be separated from Alsike Clover seed by means of a fine riddle adapted to the purpose, so that the former remains, while the latter passes through the riddle; but this is not the case with timothy seed, which is so fine that even in the last riddling (of which more below) it cannot be separated from the Alsike clover seed. It is therefore best in the early summer, if it be observed that the Alsike clover is mixed with timothy, to mow the timothy as soon as it has shot into the ear, provided the seed of the Alsike clover is intended for the market.

Alsike clover is threshed like red clover. The experience of the farmer will direct him to the best method of separating the seed from the pod. It may be done by passing the straw through a threshing machine, and then carefully separating it from the pods, which must be again (and perhaps more than once) passed through the machine to open them. But a better method, probably, is to thresh with the flail; for by this method the seed is disengaged from the pod, and falls on the floor, instead of being blown away and often lost by the action of the machine. The pod is also more effectually and surely opened by the use of the flail.

When the seed has been winnowed on the corn sieve, it is riddled through three riddles of different degrees of fineness adapted to the purpose. The coarsest riddle is used first to separate coarse weed seed and anything else that may be mixed with the Alsike clover seed; then the second; and, lastly, the third and finest riddle. If the seed be dusty when it has passed through the last riddle, then, as a final process, it is slowly and cautiously passed through the corn sieve once more, by which means the dust is blown away.

MANY persons who are well-informed on most subjects, are extraordinarily ignorant of the natural history of bees, and the economy of the bee-hive. Perhaps we might venture to suggest that more pains should be taken at schools or by parents to inform young persons on this, in connection with kindred subjects. As an amusing illustration of the ignorance referred to, we transcribe an order we received a short time since from a seminary in the north of England. The young gentleman thus writes: "Master —— presents his compliments to Messrs. Neighbour, and begs they will send him a swarm of bees; he encloses *six postage stamps*, and hopes they will send him a *good* swarm." This embryo naturalist was evidently of a mercantile turn, and had a mind to buy in the cheapest market, for in a postcript he adds: "Please let it be four pence, if you can!" We need scarcely say that in reply we endeavored to enlighten our juvenile correspondent as to what constitutes a swarm of bees, and returned the stamps with our thanks. —*Neighbour's Apiary.*

Analysis of Pollen.

BY DR. ASMUSZ.

Dr. Donnoff was the first to subject the pollen gathered by bees to analysis, and communicated the result to the *Bienenzeitung*, vol. 12, No. 19. I undertook the same task last summer, and am able to furnish some further details.

This substance, as found in the hives, is commonly called *pollen;* but as it undergoes considerable change after being collected by the bees, that designation is not entirely correct. *Bee-bread* is the more appropriate term.

When bee-bread is immersed in water, it separates into a powdery mass resembling potato meal, and becomes loosely deposited on the bottom of the containing vessel, while the water assumes a translucent yellow color. This liquid, according to the quanity of water used, has a more or less sweetish taste, somewhat disagreable, resembling that of *Rhamnus frangula*, (Alder-Buckthorn,) with an acid of reaction.

If filtered and boiled, the fluid becomes turbid at 122° F., and a quantity of white flakes are deposited. These consist almost wholly of pure albumen, and become more abundant the higher the temperature is raised. Soon after reaching the boiling point, the coagulation of albumen ceases; and if now again filtered, the clear liquid will be somewhat deeper colored than before. When again boiled, it becomes gradually inspissated and syrupy, with a more sweetish taste, and the odor of boiling honey. On cooling, a clear yellowish jelly is formed, which is insoluble in ether and alcohol, and consists essentially of pectic acid and grapesugar. If set in a warm place, butyric acid will speedily be generated in the jelly. Butyric acid, indeed, is found free and in considerable quantity in old bee-bread, and is perceptible from its pungent acid odor. The quantity of jelly inspissated to a syrupy consistence, obtained by boiling, equals about thirty per cent. of the bee-bread employed.

Let us now examine the bee-bread, or rather pollen proper, deposited in the containing vessel. If this meal be digested in alcohol several days, the liquor will be colored intensely yellow, and have a somewhat bitter and astringent taste. When filtered and mixed with a large proportion of water, the liquid immediately becomes turbid and assumes a milky appearance. In a few seconds, whitish or cream-colored flakes are seen, which at first float on the surface, but are soon precipitated. If these be collected on a filter, and dried between tissue paper, they form an amorphous, yellowish, resiny soft mass, with an agreeable odor, resembling that of *Trollius Europeus*, (European Globe-flower,) and a bitter, strongly astringent taste. This mass is partially soluble in cold alcohol, and entirely so in hot. On cooling, myricen is separated.

The alcoholic solution has a bitter astringent taste. When mixed with water it becomes turbid, though no precipitate is formed; at least not speedily. On boiling this liquid, a reddish-colored oil collects on the surface, having the pleasant odor of the Globe-flower. Skimmed off and allowed to cool, this was found to be a soft wax, melting at a temperature of 132° F. It was readily soluble in ether, hot alcohol, and benzine; but only slightly so in cold alcohol. It was found to contain, besides myricine, acid of palmatin, stearine, oleine, and oxyd of glycyl.

A solution of this wax in alcohol, subjected to distillation, yielded a product from which, when diluted with water, a reddish etherial oil having the odor of the Globe-flower separated. Dropped on paper and allowed to evaporate, it communicated thereto an odor resembling the most fragrant tea. I designate the oil as Anthosmin.

On further evaporation of the liquid referred to, after the wax had been skimmed off, resin was deposited on the bottom and sides of the vessel. When nearly altogether evaporated, it was removed from the fire, and set aside. In a few minutes, small needle-shaped, bitter-tasting crystals were deposited along with the resin. These contained hyppuric acid, and were separated from the resin by means of warm water, thus obtaining the resin pure.

This resin is of a dull green color, hard, but can easily be pulverized. It is inodorous, with an astringent taste. It is readily soluble in ether, alcohol, and benzine, imparting to these a yellowish green color. When heated, it does not properly melt, but swells up like amber. Dissolved in a small quantity of hot alcohol, it soon crystallizes in slender, greenish, satiny spicula. It belongs to the group of coloring substances. I will call it *Cerethin.*

After treating it with alcohol, the pollen was digested in ether, which soon became colored deep-red. It was then separated from the insoluble matters by filtration, and allowed to evaporate, leaving as a residuum a soft, beautiful red-colored fat, which was found to be identical with the wax previously obtained, except that it contained more coloring matter, which could not be separated from the wax. I had consequently to recur again the unadulterated bee-bread, and adopt a special process to separate the coloring matter.

This insoluble portion of the bee-bread or the meal was a dull white, inodorous, and insipid, delicate powder, consisting of pollenin and cellulose.

To obtain the orange coloring matter, a quantity of fresh bee-bread was digested in water, to remove the sacharine gelatinous elements. When this was effected, the meal was collected on a filter, and then shaken in ether to extract the fatty portion and the wax. After decanting the ether, and pressing the meal, the latter was boiled some time in a solution of carbonate of potash. The decoction was then filtered, and to the liquid thus obtained, neutral acetate of lead was added, sufficient to precipitate the coloring matter, which settled, in yellow flakes, at the bottom of the containing vessel. It was separated from the liquid acetate of lead by filtration, and washed in distilled water. It was then mixed with sulphate of hydrogen, thus converting the oxyd into sulphate of lead. It was then again washed with water, and the

coloring matter of the precipitate extracted by means of boiling alcohol, which became colored intensely yellow, with a slight tinge of green. The alcohol was then evaporated in a water bath, and the moist powder which remained as a residuum dried on tissue paper. After desiccation it formed a greenish yellow, amorphous, inodorous, and nearly tasteless powder, readily soluble in ether, alcohol, and aqueous alkalies, having a brilliant yellow color, with a faint greenish tinge.

This greenish tinge is derived from another substance accompanying the coloring matter, the resin, namely, already referred to, (Cerinthin,) which adheres obstinately to the yellow coloring matter. Only a very small quantity of this powder (which I will call Erithalin) is obtained chiefly because the greater portion of the coloring matter was extracted by the ether with which it was treated.

The Erithalin is contained entirely pure in the red wax obtained by the above-described process. One grain of this wax suffices to color five ounces of alcohol a splendid yellow, so intense is its coloring quality.

Hence, according to my investigations, bee-bread consists of the following substances:

1. Albumen.
2. Pectic acid.
3. Grapesugar.
4. Butyric acid.
5. Myricene.
6. Palmatin acid.
7. Stearine acid.
8. Oleic acid.
9. Glycloxyd.
10. Anthosmim.
11. Hyppuric acid.
12. Cerinthin.
13. Pollenin.
14. Cellulose.
15. Eritholin.

Of the enumerated fifteen substances only three—albumen, hyppuric acid, and pollenin—are nitrogenous. The rest consist of carbon, hydrogen, and oxygen.

The most important nutritious substances are, unquestionably, albumen, (7 per cent.,) pectin, grapesugar, and the fats, (5 per cent.) Possibly, also, the hyppuric acid. The other substances play a subordinate part as nutriment; and some, such as cellulose, are of no account whatever, being discharged undigested by the bees.

The Anthosmin and Erithalin (perhaps the Cerinthin likewise) are exhalations from the body of the bee, and seem to penetrate the entire mass of the combs and the whole interior of the hive; the Anthosmin communicating its peculiar odor to the wax, and the Erithalin imparting thereto its yellow color, frequently coloring also the frames and the internal surface of the hive. Both substances are readily procured from yellow wax.

It certainly appears strange that beings whose form differs so widely from that of man as that of insects does, should nevertheless make a much nearer approach to his intellectual superiority than any of the vertebrate animals. Not one of the latter, in fact, can be compared, in this respect, with the bee or the ant.

For the American Bee Journal.

Making Bees-wax—A Simple Process.

I have just been renovating a quantity of bees-wax. There were dirt, cocoon linings, and other impurities in it, so that it was unsalable, unless at a very low price. I will give your readers the plan, as it may be of service to some of them.

I would say here that in making wax no more vessels should be used than are absolutely necessary, as it is considerable trouble to clean them. Besides, the simplest way is the best. Now for the process.

VESSELS USED.

I use only one vessel for melting the wax, and one for moulding purposes. These are enough, unless the cakes are made small. For melting large quantities of *comb* a tin boiler is just the thing, but for wax a milk pan will answer every purpose.

THE PROCESS.

To keep the wax from burning, put a small quantity of water into the pan, and then fill it with wax. Place the pan directly over the fire, with the griddle removed. As soon as melted, take the pan off, so that the sediment will pass to the bottom. It will settle in a few minutes, and the wax will be quite free from any impurities. Now dip off the wax with a large spoon into the moulding-dish, being careful not to dip into the settlings. No strainer will be needed if care be used in this respect. When most of the wax is taken off, fill the pan again, and proceed as before. When through, pour into the pan a quart or so of boiling water, and set it away to cool. The wax remaining will form on the top, and when cold can be taken off, and the sediment adhering to the lower surface cut away. Now throw the settlings away, and melt the wax again, if there be enough to pay the trouble. Water should be used, so that the sediment remaining may be out of the way of the last dipping. Mould this wax into a separate dish; but before doing so, put a small quantity of *hot* water into the dish. When cold, scrape the bottom of the wax. This finishes the purification of the wax, and renders it marketable. The wax from *comb* is secured in the same way. There are other methods, but I prefer this, as it is simple, practicable, and easily understood.

The vessels for moulding should be greased with lard, or dipped into *cold* water to prevent the wax sticking to them.

TO CLEAN THE VESSELS

Dip them into *boiling* water, and then quickly rub them with paper. This repeated two or three times will clean them thoroughly.

M. M. Baldridge.

St. Charles, Kane Co., Ills.

It seems impossible to conceive how any naturalist who takes nature for his guide, could think of placing the headless and almost inanimate oyster higher in the scale of creation than the bee and the ant, because the former happens to have a heart, while the latter have none.

For the American Bee Gazette.

Do Drones Go from One Apiary to Another, and Enter a Strange Hive?

This is a question that I should be pleased to see answered. I am inclined to believe that they do. First, because Italian drones have been found in hives of black bees. Second, because bees bearing marks of Italian blood have been in stocks of black bees in this section of the country, at least four miles from where any Italians were known to be kept, two instances last season, and one this season. This is the first season that I have kept Italians; and in opening hives of black bees I found Italian drones in some of them. This induces me to believe that they go from one apiary to another, and are well received. If this be the fact in the case, it will be difficult to keep Italians pure while there are any black bees left in the country, and that it is true is not contrary to the nature and habits of the honey bee.

I have written the above in order to bring that particular subject before the public, as I think it a subject of importance to bee-keepers.

You are at liberty to throw this in the fire if you think proper to do so.

Yours, very truly,

MORRIS SMITH.

Hermaphrodite Insects

Mr. Bond has exhibited to the Entomological Society, hermaphrodites of the *Antocharis Cardamines* and *Papilio Machaon*, the former captured near London, the latter from Whittlesea Mere. In both specimens the right side of the insect was of the female form, and the left side of the male form.

The President of the Society has also shown drawings of two hermaphrodites of the honey-bee. In the first specimen the right side partook of the male characters, the antenna, eye, anterior and intermediate leg being male, whilst the wing and posterior leg were female or worker, and the left side was entirely worker. The second specimen was partly male and partly worker, the left side partaking of the male characters; the left eye, antennæ, wing, anterior, intermediate, and posterior leg being of the true male form; the abdomen was considerably enlarged on the left side.—*Year Book of Facts*, 1864.

For the American Bee Gazette.

LANGSTROTH says: "It should, therefore, be considered a first principle in bee-culture never to melt good combs." But how is the honey to be obtained? I have not been able to remove the honey from new combs without melting them. I find the application of heat sufficient to cause the honey to drain, makes new comb very soft. Will some of your readers say how honey can be taken, and the combs preserved? Also, what is the best manual for beginners in apiculture?

NOVICE.

For the American Bee Gazette.

Editor Bee Gazette:

It is a long time since I promised something occasionally for your paper. I have been too much engaged to fulfil that pledge till now, when I am just ready to begin, and trust for the next few months at least I may be able to make amends. Let me say, however, that I think you have done quite as well without me. A few articles only need criticism, otherwise, you have given us a great deal of valuable information.

In the one article relative to the new process of straining honey, I hope we have the germ that will grow into results of more real value than anything that has been given us in a long while. The idea of obtaining the honey from the old combs of the hive pure, free from all taste of bee-bread, preserving the combs to be filled again, gives me vision of a revolution in bee-culture; of how we shall establish another character for the flavor of our strained honey, with an increased demand. Of how we shall get along with a simple hive—having the honey stored in the hive—and relieve the patent vender from all further contrivance for supers. Of how we shall double or treble that quantity of our surplus by having it stored in the body of the hive, with the combs ready made, &c., &c. As but few bee-keepers can realize the advantage of this, I will not venture any further anticipations just now.

I do not feel quite sure of success, but have sufficient faith to make a trial some time next season. I shall make the strainer. If it will begin to do what is claimed for it, I cannot afford to do without it, let it cost what it will. In its construction I may not follow the pattern exactly, but retain the principle, and if the result is anything valuable, or otherwise, it shall be made known through the GAZETTE. I hate monopolies; and I here enter a protest, if the thing does work, and any one makes an improvement or alteration claimed as such, that it shall not be covered with a patent.

M. QUINBY.

ST. JOHNSVILLE, N. Y.

For the American Bee Gazette.

Mixing of Black and Italian Bees.

I have just read the article on this subject in the October number of the GAZETTE, and thinking that an instance of it, which came under my notice, might be interesting to some of your readers, I take the liberty of sending it.

This spring, while watching an after-swarm belonging to one of my neighbors, which was cast by a hive of black bees, I was much surprised to see that about half the bees were well-marked Italians. Now at this time I knew that there were no Italian hives nearer than three miles, where there was a single hive, and at the distance of seven miles there was a large Italian apiary. Now the drone which met this queen must have flown at least three miles from his hive.

W.

ELKRIDGE, MD., NOV. 7, 1866.

Don't Kill Your Bees.

There are three reasons why you should not kill your bees. It is *unthrifty*, *unnecessary*, and *unnatural*.

It is unthrifty—because, in the worst of seasons, bees will always maintain themselves; and, in better seasons, the more bees you have the more honey you will obtain.

It is unnecessary—because there is no ordinary hive, which, in the end of the year, will not hold one or two additional swarms. A full hive in August will be very different in October. In the first place, the drones have been dispatched. The writer of this article has counted, from one hive alone, eleven hundred, which the bees had been assisted in killing, independent of those that had escaped by flight. These large and cumbrous denizens of the hive having been disposed of, leave room for a considerable number of additional bees. Secondly, many of the old workers have been rendered useless from their wings being worn out; and, lastly, the cold and sudden showers of autumn have laid low many more, never to rise again. Hence, if there were no other reasons for putting two or three hives into one, this incidental diminution of these numbers would be a sufficient one.

But, admitting that the additional number of bees would crowd the hive too much, this may easily be remedied by adding an extra eke, till the cold of winter drives the bees into closer contact with each other, when the eke should be removed.

With regard to the supply of food, which is the difficulty generally apprehended, I may observe that it is a maxim with all intelligent writers on the subject, that if there be food enough in the hive for the original swarm, there will be enough for as many more as the hive will contain, for they keep each other warm, and *the warmer they are, the less they will eat*, provided the heat be not so great as to produce violent perspiration. And let it be remembered, that the stronger the hive is in winter, the earlier it will be ready to send forth a swarm in spring.

And, lastly, *it is unnatural*. You have watched through the long summer's days these little busy householders toiling on with exemplary industry, and exhibiting in their domestic economy a wonderful instance of the wisdom and goodness of God, and affording a significant hint of the existence of a world, near, but external to ourselves, the mysteries of which we have yet been permitted only partially and imperfectly to fathom. And can you, without a feeling of remorse, consign to a wholesale and murderous destruction, these useful auxiliaries; this vigilant commissariat of nature's own providing? It is a cruel and unnecessary practice, to which custom has hardened the heart, and blunted the senses. It is cruel, and it is positively injurious to your own interests. And, if no other considerations will weigh with you, at least let this last one influence you in sparing the lives of those useful insects.

The destruction of the bees in order to take the honey is an old custom; and an old custom is not easily got rid of. But when it first prevailed, there might have been some excuse for it; *now* there is none, for, with a little attention and practice, your bees may be handled with safety, and rendered as tractable as stupor and helplessness can make them.

MRS. PRATT.

For the American Bee Gazette.

Raising Queens—Cause of Swarming, &c.

I am unable to reconcile with my observation Mr. Flanders' description of the interior of the hive just before swarming. (See "chapters on the honey-bee on pages 8, 9, and 75. By W. A. Flanders.")

The cause of swarming is different, and much more removed from sight than the one he assigns. That "the queen finds no empty cells in which to deposit her eggs," on account of accumulated stores of honey, will possibly be found true in some cases. That "she locates herself generally in a remote place on the edge of a comb and extrudes her eggs" is an assertion very difficult to prove correct. That "the whole swarm assumes the condition of a swarm that has lost its queen" is very uncommon, and equally difficult to prove; and when he asserts—"and when the young queen emerges from the cell, the old queen gets up a rivalry and undertakes to destroy the queen or queens, and being unable to do so, by reason of the workers, she sallies forth, etc.," I find it so greatly at variance with *all* my observations, that I cannot let it pass for correct teaching of natural history, without a protest. Correct practice will flow only from correct knowledge. This matter is easily tested with the movable combs.

Whoever observes close enough to *know* whereof they report, will not find, I think, more than one case in fifty or one hundred where the old queen leaves with a swarm after her rival daughter has left her cell. Other than the swarming season, I have known a few instances where the mother was superceded by her daughter, maturing while she was present. But this must not be confounded with the swarming season, as no swarm issued, and probably had no intention to do so. On examination in these cases, the old queen always showed some defect.

Again, I hardly think his "patented" method of queen-raising will speedily grow into favor with the masses, especially with such bunglers as myself. I have repeatedly tried the "grafting fluid," which he says is the means of "starting any number of queens," without succeeding in raising a single queen from any. I have sometimes had nuclei refuse to rear queens from the best brood I could give them. Cells were often commenced, and the larvæ seen floating in this "fluid," and yet the whole was abandoned, removed, and no queens raised.

I mention this, not because it is the rule to refuse—which it is not—but to show that the "grafting fluid" is not always reliable to raise

"any number of queens." Neither do I think its introduction would prevent raising them. I consider it simply labor lost; doing neither good or hurt; and all contention as to who first discovered the application, unless it can be shown to effect more in other hands than mine, had better be dispensed with.

Another point in Mr. Flanders' management I do not approve. That is, the four days lost time in rearing brood in one-half the hive. A prolific queen during that time might secure from four to six thousand bees, which is thrown away by protracting her absence that time longer than necessary. I should not be surprised to find nearly all the eggs hatched into larvæ by that time, and thereby suffer a defeat.

The cages for hatching queens, "constructed by boring holes through a board," no doubt answers a good purpose, but as it separates the bees, and sometimes they leave one side exposed to a chill, I have made a different arrangement that I like better—not patented—which I will describe, if you wish, some time when I have more room.

M. QUINBY.

ST. JOHNSVILLE, N. Y.

☞ THE article on "*Extraordinary Swarming*" in our last number, dated at Delhi, Ohio, should have been dated at "Delhi, Ingham county, Michigan." It was an inadvertant error, such as will at times occur, much to the annoyance and vexation of the proof-reader.

For the American Bee Gazette.

Robbing.

HOW IT COMMENCES GENERALLY.

A bee or two fly around the entrance; the heated air from within makes them and others of the same scent, with those in the hive, and they acquire boldness by not being attacked at the entrance, enter, and are not molested, as they have the pass or same scent of the owners of the hive; take a load home; others go through the same process, until the hive is robbed, unless stopped by changing the scent of the bees of either party. We stop it best by putting something in the robbers' hive like a piece of onion; any kind of mint, or feeding a little scented feed at night; keep the entrance close; keep strong stocks

JAMES M. MARVIN.

ST. CHARLES, KANE CO., ILLS.

A DOUBLED hive will consume no more honey in the winter than a single one. The reason of it seems to be, that where there are many bees in a hive, they can keep warm by crowding close together, instead of eating, so that in a full hive the same quantity of honey goes further than in a weak one, as each bee eats less. They keep themselves warm from the outside, and so do not require to be heated in the inside, as a man who can, by keeping bees, or any other honest way, have a good coat on his back, is warm enough without a brandy bottle.

MONTHLY MANAGEMENT.

Care of Bees.

As during the month of January there is usually little for the bee-keeper to do, beyond a general supervision of his hives, it may not be out of place here to submit some general remarks on the care and treatment of bees.

We are by no means to suppose that the care of bees means a continual officious interference with them—lifting the hives to ascertain their weight; turning them up to inspect the condition of the combs, or opening the sidelights to see what may not well be seen. Every such disturbance is felt to be an annoyance by this quiet-loving insect, produces more or less excitement in the mass, and causes an increased consumption of honey.

This of course is less injurious during the working season than at other periods, but even then it is a disadvantageous interruption of their labor, which should be avoided when possible. Important objects may sometimes make it indispensable to subject the bees to rather rough handling; but whatever is thus undertaken should be executed with all possible expedition. Most of the old writers caution beginners against such frequent intermeddling, asserting that those colonies in an apiary which are least disturbed and even rarely visited by their owner, generally accumulate the largest stores of honey. Our own observation and experience corroborate this.

The recent discovery, too, made by Hübler, Rothe, and Keding, that such disturbances often cause the workers to encase and kill their own queens, shows how important it is that colonies should never be exposed to needless or avoidable annoyances. Even standing in front of a hive when the bees are flying, after noon, at a time when queens are being reared, may cause the loss of one returning from abroad.

While thus discountenancing all unnecessary interference, we would earnestly recommend a regular and observant supervision of the hives, noting the deportment of the bees of each colony. To this end it is not necessary to stand watching them hour after hour. A single glance is ofttimes sufficient to ascertain the condition of a colony, and the practiced eye will speedily detect any unusual appearances, by which one colony differs in deportment from another. Should aught suspicious be observed, investigation of the cause should immediately be made, though as gently and quietly as possible. Passing and repassing in front of the hives, calmly and sedately, to accustom the bees to your presence, is in no wise objectionable, provided it be done at proper times, when not interfering with the flight and labor of the busy multitude, or, as above stated, endangering the safety of a newly-bred queen.

BEE-CULTURE, this season, promises to make great progress, as much unusual interest is taken by bee-keepers for the cultivation of bees. We will soon be able to make favorable comparison, in that line, with that of Europe.